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(54) Tissue put-up.

(57) A compact tissue put-up contains folded tissue sheets which are interfolded with consecutive folded sheets within the carton to provide pop-up dispensing strength and carton design flexibility.

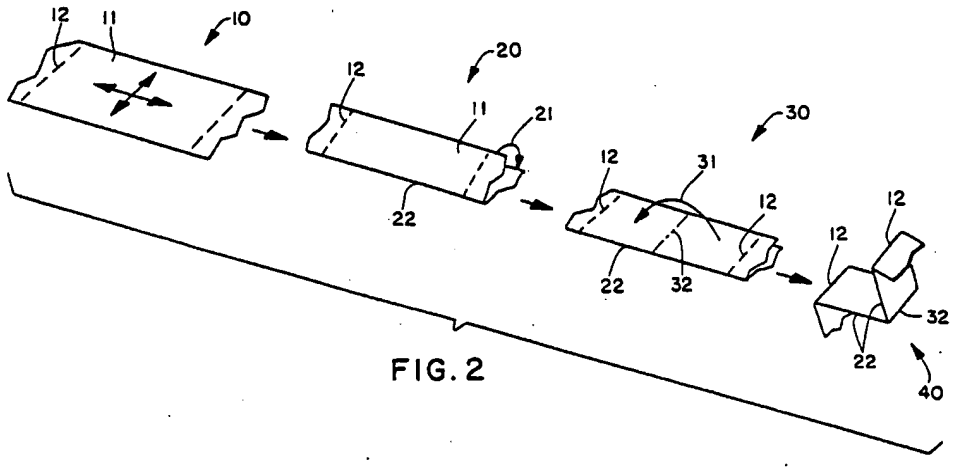

FIG. 2

EP 0 302 382 A1

TISSUE PUT-UP

Background of the Invention

Tissue put-ups, which consists of a carton containing a clip of tissues, are available in a variety of shapes and sizes. One popular put-up has been the upright carton with tissue pop-up dispensing. This type of put-up is described in U.S. Patent No. 3,369,700 issued February 20, 1968 to Howard N. Nelson and is also described herein with reference to Figure 1. It essentially contains a clip of individual interfolded tissues which has been folded in an inverted "U" shape, which is necessary in order to fit conventionally interfolded tissues into an upright carton. Although this type of product has many advantages, the first tissues removed from the carton are frequently torn because of insufficient sheet strength relative to the initial resistance resulting from the compaction of the full clip within the carton. In addition, the box is larger than necessary to hold an equivalent number of tissues.

Therefore there is a need for an improved pop-up tissue put-up in which the initial sheets removed are less likely to be torn and which provides additional flexibility in package design and configuration.

Summary of the Invention

Broadly, the invention resides in a tissue put-up comprising a carton and a clip of interfolded tissues, said carton having a dispensing opening through which the tissues are individually withdrawn, each of said tissues within the carton being at least once-folded to form one or more fold lines and each of said folded tissues being interfolded with adjacent folded tissues such that the interfold line is perpendicular to at least one of the fold lines.

More specifically, the invention resides in a tissue put-up for "pop-up" dispensing comprising a carton and a clip of interfolded tissues, said carton having a dispensing opening through which the tissues are individually withdrawn, each of said tissues within the carton being at least once-folded such that the fold line is parallel to the machine direction of the tissue and each of said folded tissues being interfolded with adjacent folded tissues such that the interfold line is parallel to the cross-machine direction of the tissue, wherein the interfolded tissues are withdrawn from the carton in a direction aligned with the machine direction of the tissue.

It has been discovered that the tissue put-up of this invention provides many advantages over conventional tissue put-ups. For example, the tissue put-up of this invention provides at least double the amount of tissue in the same size carton as discussed above in connection with the prior art or, alternatively the same amount of tissue in a carton one-half the size or smaller. In addition, by interfolding folded sheets as described, the tissues have more than twice the strength to resist tearing during pop-up dispensing, due in part to the folded configuration of the tissue and in part to the fact that the tissue is preferably positioned to be withdrawn from the carton in a direction substantially parallel to the machine direction of the sheet, which is typically significantly stronger than the cross-machine direction of the sheet. Furthermore, this invention provides wide flexibility in carton sizes and shapes while maintaining individual tissue sheet sizes with pop-up dispensing. It further provides dispensed tissues which are already folded, which appeals to certain consumers and is useful for certain specialty applications. In addition, it increases productivity potential for an interfolder of any given width by presenting prefolded, and thus narrower, sheets to the interfolder.

Although this invention is applicable to any sheet material, it is more applicable to cellulosic facial tissues having a basis weight of from about 25 to 35 grams per square meter.

Brief Description of the Drawing

Figure 1 is an illustration (top and side views) of a prior art upright facial tissue put-up.

Figure 2 is a schematic representation of the stages through which a tissue sheet undergoes during the manufacture of a put-up in accordance with this invention.

Figure 3 is a cross-sectional representation of an interfolded clip of tissues which consists of two interfolded, continuous perforated webs of the type illustrated in the last stage of Figure 2.

Figure 4 is a cross-sectional representation of a preferred put-up carton in accordance with this invention, comprising a carton containing the clip of interfolded tissues of Figure 3.

Detailed Description of the Drawing

Figure 1 illustrates a prior art put-up, showing a top view and a side view 2 of the carton containing a U-folded clip of interfolded tissues. Shown is the top 4 of the carton containing an oval dispensing opening 6. The cross-machine direction (CD) and the machine direction (MD) of the tissues within the carton are indicated by the labelled arrows. The leading edge 7 of the top interfolded tissue is grasped by the user to pull the first tissue from the box. The side view of the carton clearly illustrates the U-folded clip 8 of interfolded tissues (shown in phantom lines). The MD direction of the tissue is illustrated by the labelled arrow. As is well known to those skilled in the art of tissue manufacture, the MD corresponds to the direction in which the tissue travels through the tissue machine during its manufacture and the CD is the perpendicular direction.

When the carton is first opened the U-shaped clip of tissues is compressed within the carton. As a result, in some instances, the frictional resistance imparted by this compression causes the first few tissues to tear during dispensing. This situation is compounded by the fact that the tissues are removed by unfolding and pulling them through the dispensing opening in a direction aligned with the CD of the tissue. Unfortunately the CD of the tissue typically has about 40% less tensile strength than the MD and stretch of only about 5% compared to an MD stretch of about 15 to 25%. The corresponding toughness, as measured by tensile energy absorption (TEA), is only about 1.5 grams per centimeter in the CD compared to about 11.0 grams per centimeter in the MD. The result is a further tendency to tear during dispensing until enough tissues have been removed to alleviate the compression and resulting frictional resistance.

The put-up of this invention overcomes these problems and is illustrated in Figure 2, which depicts in several consecutive stages the folding process undergone by a sheet of tissue during the manufacturing process. Interfolding apparatus for converting tissue in accordance with this invention is known in the papermaking art and is commercially available from papermaking equipment manufacturers. For purposes of simplicity, the drawing focuses on one individual sheet of tissue, although it must be kept in mind that in practice each individual sheet is part of a continuous web wherein adjacent sheets are preferably separated and defined by lines of perforation.

Shown in the first stage 10 is a perforated continuous tissue web 11 which has lines of perforation 12 which define the length of the individual tissue sheets within the web. The MD and CD of the web are indicated by the appropriate arrows. In the second stage 20 the sheet 11 is being folded in the direction of the arrow 21. This is easily accomplished by passing the continuous web sheet over a folding board. The resulting sheet is once-folded having a folding line 22 parallel to the MD of the sheet. In the third stage 30 the once-folded sheet is being folded in a different direction as indicated by the arrow 31. The folding line 32 is hereinafter referred to as an interfolding line to distinguish it from the previous folding line 22. The interfolding line 32 is parallel to the CD of the sheet. Lastly, shown in the fourth stage 40 is the folded sheet resulting from the interfolding step illustrated in the third stage.

Figure 3 shows several folded sheets of one continuous, perforated folded web interfolded with corresponding folded sheets of another continuous, perforated web 51. Apparatus for accomplishing the interfolding of the two perforated folded webs, separating them into clips, and packaging the interfolded clips is well known in the papermaking converting art and is available commercially.

Shown in Figure 4 is a product of this invention, i.e. a put-up comprising a carton 61 containing the interfolded tissue clip illustrated in Figure 3. Note that the tissues are withdrawn through the dispensing opening 61 in a direction corresponding to the MD of the tissue or sheet being withdrawn.

In practicing this invention, the web can be initially folded parallel to the MD of the web one or more times as desired or as is necessary to multiply the increase in MD tensile strength of the tissue. Such multiple folds are commonly referred to as "C" folds, "Z" folds or "W" folds. The single fold embodiment illustrated in Figure 2 is sometimes referred to as a "V" fold. Other types of folds are also within the scope of this invention including, without limitation, multiple folds prior to interfolding such that the fold lines are perpendicular to each other. This is distinguished from the abovesaid C-fold, Z-fold, and W-fold, wherein the fold lines are all parallel to each other. In each case, however, the number of panels of plies of the tissue is effectively increased for purposes of compaction and greater strength during dispensing.

EXAMPLES

In order to illustrate the advantages of a put-up in accordance with this invention, the MD and CD tensile strength and tensile energy absorption were measured and compared for a two-ply facial tissue of the type illustrated in Figure 1 versus several different embodiments of this invention.

The equivalent number of plies for each sample is indicated in parentheses. The results are set forth in Table I below:

Table I

	Prior Art (2-ply)	V-fold (4-ply)	Z-fold (6-ply)	W-fold (8-ply)
Tensile Strength (grams/3")				
MD (dry)	884	1867	2878	8063
CD (dry)	391	--	--	--
Percent MD Stretch	16.4	16.4	17.3	17.3
Percent CD Stretch	5.3	--	--	--
TEA (Toughness) (grams/cm)				
MD	11.2	23.7	37.9	53.0
CD	1.6	--	--	--

These results clearly illustrate the large synergistic increases in strength and durability obtained with the V-fold, Z-fold, and W-fold embodiments of the invention. Note the low effective strength and energy absorption of the prior art two-ply product in the CD, which is the limiting factor when tissues are dispensed as illustrated in Figure 1. On the other hand, note the synergistic increase in MD strength and MD energy absorption exhibited by the various embodiments of this invention. The CD properties were not measured because of the CD strength and energy absorption are not a factor in dispensing tissues in accordance with this invention.

It will be appreciated that the foregoing examples, shown for purposes of illustration, are not be be construed as limiting the scope of this invention.

Claims

1. A carton containing a clip of interfolded tissues, said carton having a dispensing opening through which the tissues are individually withdrawn, each of said tissues within the carton being at least once-folded to form one or more fold lines and each of said folded tissues being interfolded with adjacent folded tissues such that the interfold line is perpendicular to at least one of the fold lines.

2. The carton of Claim 1 wherein each tissue is once-folded.

3. The carton of Claim 1 wherein each tissue is twice-folded.

4. The carton of Claim 1 wherein each tissue is thrice-folded.

5. A carton containing a clip of interfolded tissues, said carton having a dispensing opening through which the tissues are individually withdrawn, each of said tissues within the carton being at least once-folded such that the fold line is parallel to the machine direction of the tissue and each of said tissues being interfolded with upper and lower adjacent folded tissues such that the interfolding line is parallel to the cross-machine direction of the tissue.

6. The carton of Claim 5 wherein each tissue is once-folded.

7. The carton of Claim 5 wherein each tissue is twice-folded.

8. The carton of Claim 5 wherein each tissue is thrice-folded.

9. The carton of Claim 5 wherein the dispensing opening is in the top face of the carton.

10. The carton of Claim 5 wherein the dispensing opening is elongated in a direction aligned with the cross-machine direction of the interfolded tissues within the carton.

11. The carton of Claim 5 wherein the basis weight of the tissue is from about 15 to about 100 grams per square meter.

12. The carton of Claim 11 wherein the basis weight of the tissue is from about 25 to about 35 grams per square meter.

13. The carton of Claim 5 wherein the interfolded tissues are perforated such that the perforations are broken when the tissue is dispensed.

14. The carton of Claim 13 wherein the dispensing opening is sufficiently restrictive to maintain each tissue in a partially removed condition after the previous tissue has been removed.

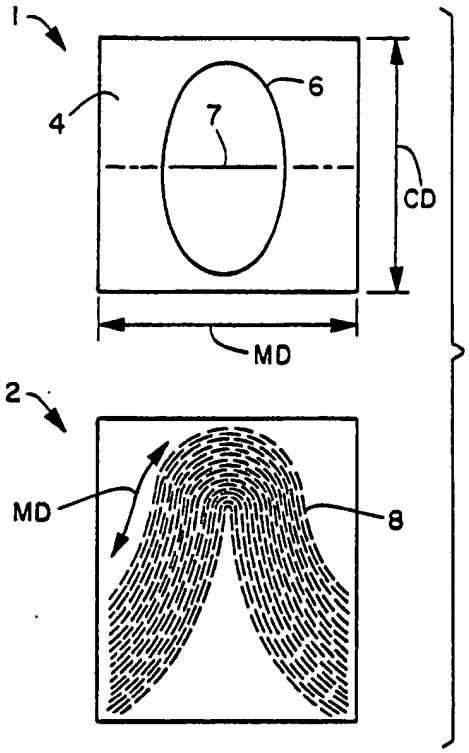

FIG. 1
(PRIOR ART)

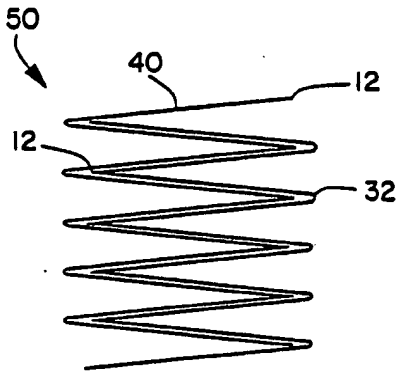

FIG. 3

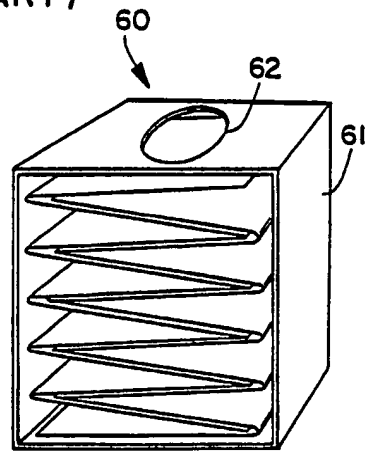

FIG. 4

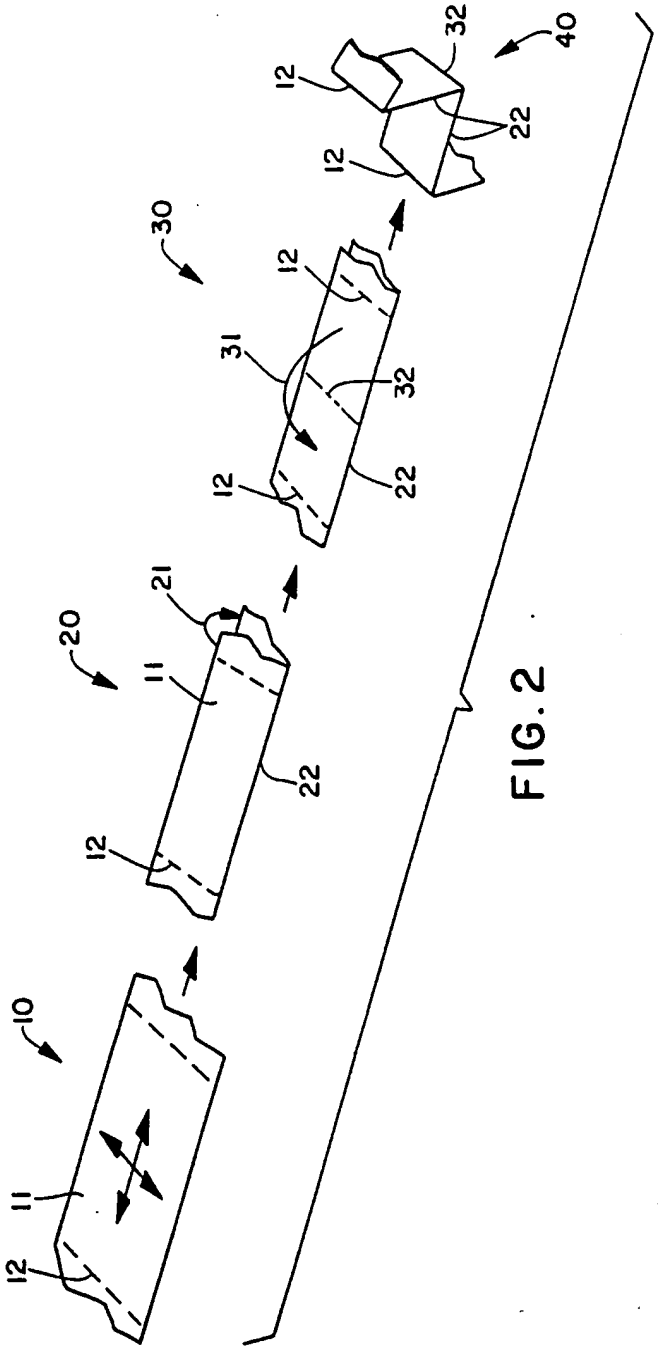

FIG. 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 88 11 2146

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
Y,A	US-A-4 200 200 (HEIN) * Column 2, lines 17-20,59-66; figure 6 *	1,3,5,6,9	A 47 K 10/42
Y,A	US-A-4 638 921 (W.C. SIGL et al.) * Column 5, lines 26-52; figures 4-7 *	1,3	
A		7	
Y	US-A-1 666 553 (CHRISTMAN) * Page 1, line 63 - page 2, line 88; figures 1-7 *	5,6,9	
A	US-A-3 795 355 (GERSTEIN) * Column 3, line 36 - column 4, line 20; figures 1-5 *	1-3,5-7,9,13,14	
A,D	US-A-3 369 700 (NELSON)		

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

A 47 K
B 65 H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	04-11-1988	PORWOLL H.P.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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